

The
United
States
of
America



The Commissioner of
Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.

Bence Lehman

Commissioner of Patents and Trademarks

Ollie M. Person
Attest



US005831944A

United States Patent [19]

Nishimura

[11] Patent Number: 5,831,944

[45] Date of Patent: Nov. 3, 1998

[54] MAGNETOOPTICAL RECORDING MEDIUM
AND METHOD FOR REPRODUCING
INFORMATION FROM A
MAGNETOOPTICAL RECORDING MEDIUM
HAVING THREE LAYERS

[75] Inventor: Naoki Nishimura, Tokyo, Japan

[73] Assignee: Canon Kabushiki Kaisha, Tokyo,
Japan

[21] Appl. No.: 858,206

[22] Filed: May 13, 1997

Related U.S. Application Data

[63] Continuation of Ser. No. 389,579, Feb. 15, 1995, abandoned,
which is a continuation-in-part of Ser. No. 111,974, Aug. 26,
1993, abandoned.

[30] Foreign Application Priority Data

Feb. 26, 1993 [JP] Japan 5-038138
Feb. 21, 1994 [JP] Japan 6-022653

[51] Int. Cl.⁶ G11B 11/00

[52] U.S. Cl. 369/13; 428/694 ML

[58] Field of Search 369/13, 14, 275.3,
369/275.2, 283, 284, 110, 112; 360/59,
114; 428/694 ML, 694 DE, 694 RL, 694 MM,
694 EC, 694 GR, 694 RE

[56] References Cited

U.S. PATENT DOCUMENTS

5,241,520 8/1993 Ohta et al. 369/13
5,278,810 1/1994 Takashi et al. 369/13
5,325,344 6/1994 Ohta et al. 369/13
5,428,585 6/1995 Hirokane et al. 369/13
5,477,528 12/1995 Murakami 369/275.3
5,486,395 1/1996 Murakami et al. 369/13 X
5,616,428 4/1997 Nishimura et al. 428/694 ML

FOREIGN PATENT DOCUMENTS

~ 0524745 2/1993 European Pat. Off. .

Primary Examiner—Ali Neyzari

Attorney, Agent, or Firm—Fitzpatrick, Cella, Harper &
Scinto

[57] ABSTRACT

A magneto-optical recording medium has a first magnetic layer which is an in-plane magnetization film at both room temperature and high temperatures and changed to a perpendicular magnetization film at intermediate temperatures, and a second magnetic layer which is composed of a perpendicular magnetization film. The recording medium enables realization of high S/N reproduction of information recorded at a pitch below the diffraction limit of light with a simple structure, and further improvement in linear recording density and track density.

2 Claims, 14 Drawing Sheets

